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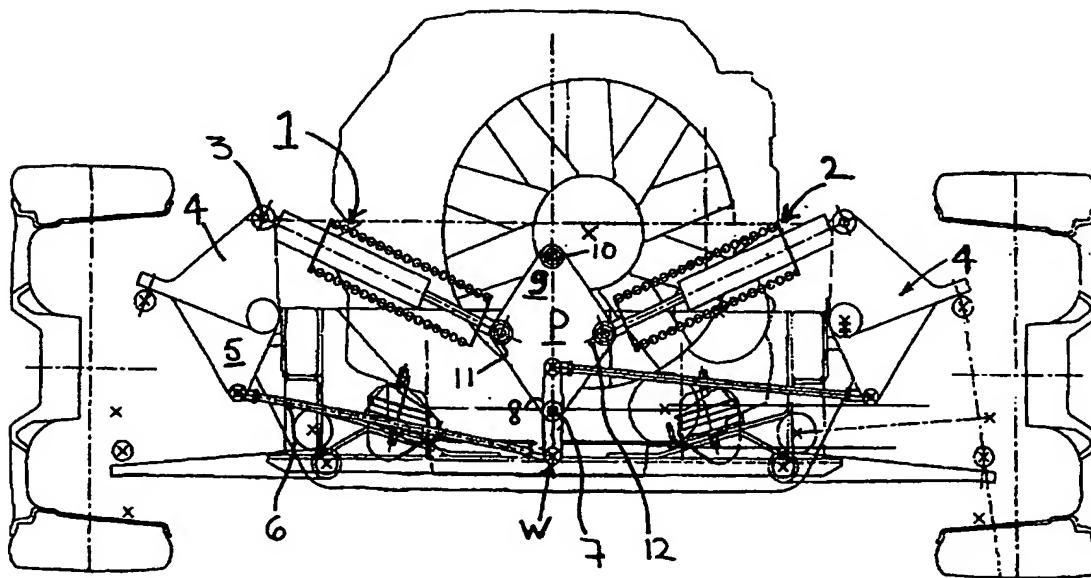
(56) Documents Cited  
**GB 1051910 A US 4573702 A**

(58) Field of Search  
UK CL (Edition O ) **B7D DCF DCH**  
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(54) Abstract Title  
**Vehicle suspension**

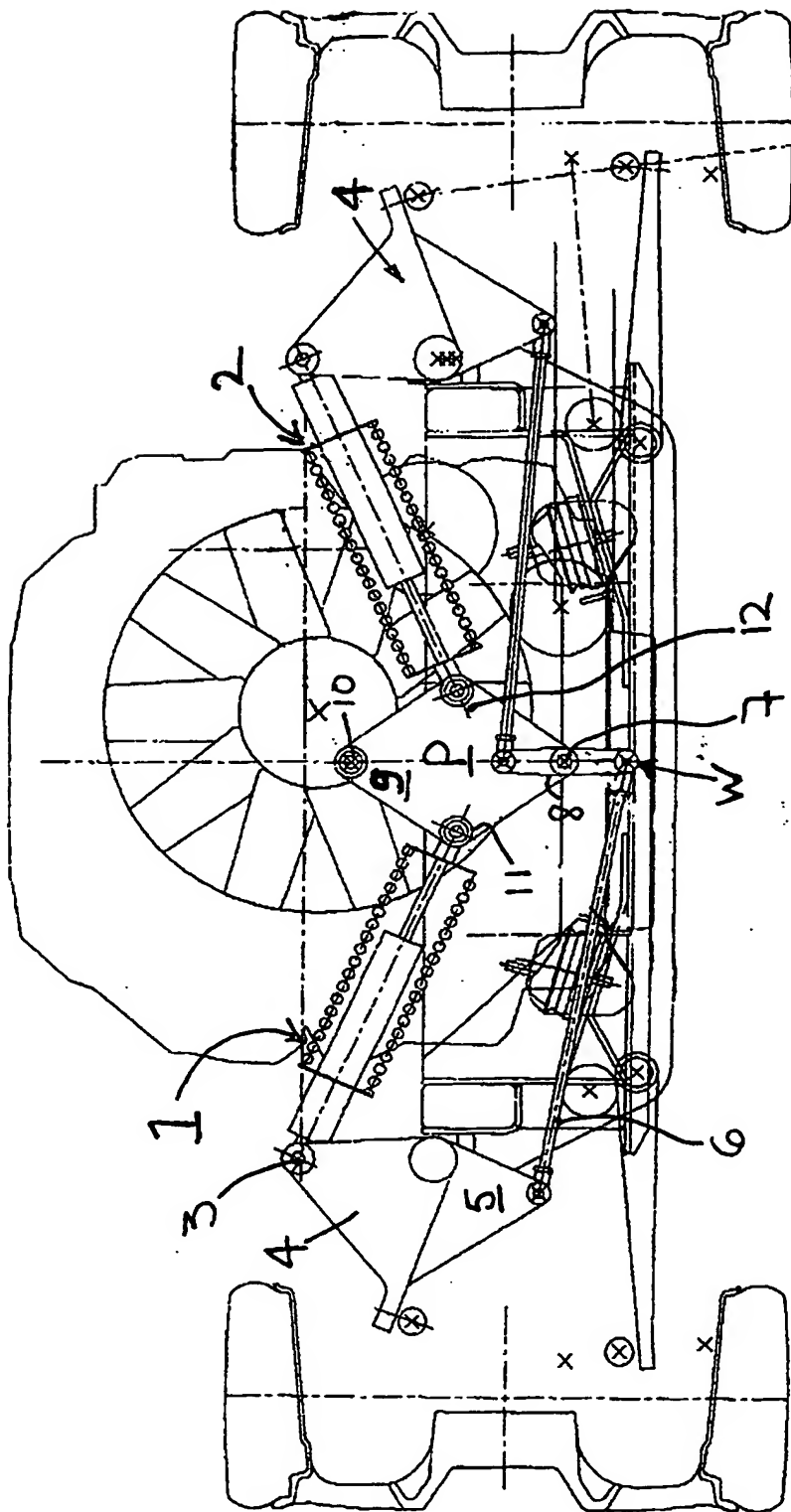
(57) A vehicle suspension system adapted to dampen vibration in roll and bounce comprises a diamond shaped plate P pivoted at its upper corner 9 on a support 10, two shock absorbers inside coil springs 1,2, each connected between the upper portion 3 of a linkage 4 connected to an axle and to opposite corners 11,12 of the plate P, and a Watts linkage W bridging the wheels is connected between lower portions 5 of the linkages 4 and the lower corner 8 of the plate P. When subjected to bounce forces the Watts linkage operates and the plate remains substantially stationary, and when subjected to roll forces the Watts linkage remains substantially stationary and the plate P pivots towards the wheel tending to rise.

**FIG.1**



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FIG.1



### **VEHICLE SUSPENSION**

The invention relates to a suspension system for a vehicle, more particularly sports cars and racing cars, especially those having rear mounted engines.

It is known to fit an anti-roll bar for such vehicles to prevent roll when cornering at speed. Such bars are more effective at damping in roll than in bounce. It is one object of this invention to provide a vehicle suspension system able to dampen vibration both in roll and bounce to substantially the same extent.

According to the invention in one aspect there is provided a suspension system for a wheeled vehicle, the system comprising opposite suspension means each connected at one end to the vehicle chassis and at the other end to opposite sides of an intermediate member, the intermediate member being pivotally mounted at its upper end on a support and being connected at its lower end to a straight line mechanism connected to opposite sides of the chassis, whereby when the vehicle is subjected to applied bounce forces the straight line mechanism operates to dampen the vertical movement and the intermediate member is substantially stationary and when the vehicle is subjected to roll forces, the straight line mechanism is substantially stationary and the intermediate member pivots towards the wheel under the roll forces and tending to rise whereby damping is substantially the same when the vehicle is subjected to bounce and/or roll forces.

Preferably the straight line mechanism is a Watts linkage.

Because the suspension system can dampen both roll and bounce there is no need for the vehicle to be provided with an anti-roll bar.

While the suspension system is of wide applicability it is seen to particularly good effect in a vehicle in which the engine is mounted towards the rear.

In order that the invention may be well understood it will now be described by way of example only with reference to the accompanying diagrammatic drawing which is a cross section through the front end of a vehicle having a rear mounted engine.

Two suspension 1,2 devices comprising two shock absorbers inside coil springs are each connected at their outer ends to the upper portion 3 of a linkage 4 connected to the axle, not shown. The lower portion 5 of the linkage 4 is connected to a respective arm 6 of a Watts linkage W bridging the two wheels. The main pivot point 7 of the linkage W is connected to the lower corner 8 of a diamond shaped plate P acting as an intermediate member. The plate P is pivotally mounted at its upper corner 9 on a support 10. The inner ends of the suspension devices 1,2 are connected to opposite corners 11, 12, of the plate P. The plate P is arranged to pivot about the support 10 only.

In use, when the vehicle is subject to an applied bounce force, i.e. vertical movement, the Watts linkage L rotates to maintain the wheels generally parallel and no rotation of the plate P takes place. In roll the Watts linkage L locks and the plate P rotates towards the rising wheel thereby compressing the spring connected to that wheel and applying the increased load to counteract roll. More importantly, however, it also applies increased damping force through the increased velocity.

Hence damping stays constant in both roll and bounce thereby improving transient behaviour and road holding. The suspension obviates the need for an anti-roll bar which tends to operate with lower effective dampening in roll than in bounce.

**CLAIMS**

1. A suspension system for a wheeled vehicle comprising opposite suspension springs each connected at one end to the vehicle chassis and at the other end to opposite sides of a plate member, the plate member being pivotally mounted at its upper end on a support and being connected at its lower end to a straight line mechanism connected to opposite sides of the chassis, whereby when the vehicle is subjected to applied bovine forces the straight line mechanism operates and the plate is substantially stationary and under applied roll forces, the straight line mechanism is substantially stationary and the plate pivots towards the wheel tending to rise whereby damping is substantially when the vehicle is subjected to bounce and roll forces.
2. A system according to Claim 1, wherein the straight line mechanism is a Watts linkage.
3. A system according to Claim 1 or 2, wherein the vehicle has no anti-roll bar.
4. A system according to any preceding Claim mounted in a vehicle which the engine is mounted towards the rear.



Application No: GB 9716978.3  
Claims searched: 1 to 4

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**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.0): B7D (DCF,DCH)

Int Cl (Ed.6): B60G 21/00,21/02,21/05

Other: Online: WPI, EDOC, JAPIO

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 1051910 A (Corbin) See especially Fig 2	1
X	US 4573702 A (Klem) See especially Fig 4	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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